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UNITED STATES DEPARTMENT OF AGRICULTURE
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in cooperation with
The Agricultural Experiment Station
and
The Engineering Experiment Station
of
THE AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS

RESULTS OF FIBER AND SPINNING TESTS OF SOME VARIETIES OF COTTON GROWN IN TEXAS, CROP OF 1940

Prepared by the
Agricultural Marketing Service

INTRODUCTION

Choosing and growing a variety of cotton with desirable manufacturing characteristics will gain for farmers and organized communities a good reputation with buyers and users, just as choosing and growing one with undesirable characteristics will result in a disadvantage from the standpoint of marketing. In an effort, therefore, to furnish producers, breeders, and others information regarding the relative merits and demerits of some varieties of cotton from the standpoint of manufacturing and yarn quality, fiber and spinning tests are being made in the laboratories of the Agricultural Marketing Service, on a number of case-historied samples in connection with the Federal-State cotton breeding, production, and improvement programs.

This report summarizes briefly the results recently obtained from 49 test lots of cotton grown at five locations in Texas during the 1940 season. Most of the varieties that have been included are those recommended by The State-Wide Cotton Committee of Texas as suitable for production in one or more areas in Texas. 1/

It is believed that agricultural advisers and community leaders who have the responsibility of recommending to growers the most suitable varieties for one-variety community production should find these results useful in drawing conclusions and making recommendations. Before making final decisions and recommendations, however, they should also give careful consideration to yield

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1/ The cottons tested were grown under the supervision of the Bureau of Plant Industry and the Texas Agricultural Experiment Station. The weather data included in this report were supplied by those agencies.

per acre, gin outturn, and other agronomic features, inasmuch as these also are factors in determining cotton farmers' incomes. 2/

Breeders also should find the results reported herein useful in their efforts to develop cotton with fiber properties that will better meet the requirements of domestic and foreign manufacturers.

GROWTH CONDITIONS

The weather during the season of 1940 was generally favorable for normal development of the crop at each of the five locations where the cottons under study were grown. The following are detailed statements regarding the more important growth and harvesting conditions at each location.

College Station: A good distribution of rainfall occurred during the spring. August was dry and little rain fell in September and October, which enabled the crop to be harvested without weather damage. The spinning lots were taken from a composite of the first, second, and third pickings.

Temple: Weather conditions were quite similar to those prevailing at College Station. The grade of cotton was lowered, however, as a result of severe root rot and angular leaf spot infections. Also, the last of the four pickings comprising the spinning test lots was exposed to considerable weather damage in the field.

Greenville: A late spring and heavy rainfall affected the growing season appreciably. Periods of clear weather occurred, however, which permitted fairly satisfactory cultivation. The first picking was exposed to heavy rains and was not included in the spinning samples which were made up entirely of cotton from the second picking.

Chillicothe: Heavy rainfall the last of May delayed planting until June 13. The growing season was dry and the harvesting season was unfavorable because of damp weather. The spinning samples were made up of cotton harvested prior to November 13, when the first frost occurred.

Victoria: A dry spring retarded growth during April and May but rains in June and July brought about a rapid improvement in the crop. A drought in August and September reduced the yields to some extent in this area. The weather conditions prevailing here during the 1940 growing season evidently were conducive to the development of superior fiber even though the yields were somewhat reduced. The samples for this test were harvested without appreciable rain damage and were ginned at a local gin; whereas, the samples from the other locations were all ginned on the Bureau of Plant Industry gin at Stoneville, Miss.

TEST PROCEDURE

When the cottons reached the laboratory the bales and packages were opened and representative samples were drawn for the fiber tests. Samples for classification were drawn from the Victoria lots and sent to Washington to be

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2/ Acre yields for the varieties can be obtained from county agents or from the Texas Agricultural Experiment Station.

classed along with samples drawn at the gin from each of the lots grown at the other four locations. The results of the classification by the Appeal Board of Review Examiners of the Agricultural Marketing Service are shown in columns 2 and 3 of the accompanying table.

Laboratory tests were made to determine various physical characteristics of the fibers as follows: Length, fineness, percentage of thin-walled fibers, tensile strength, and cellulose alinement (X-ray 40 percent angle). The results of the fiber measurements are shown in columns 10 through 14. The outstanding fiber characteristics are summarized in column 15.

A representative 5- or 6-pound sample of each cotton was manufactured in accordance with the usual methods of the laboratories. All the lots were spun into three counts of carded yarn and tested. The coarsest count spun from each lot was 22s, and the intermediate and fine counts were based on the staple length of the fiber. The percentage of waste removed by the picker and card is shown in column 4 of the table. Remarks pertaining to the average waste percentages found in previous tests of the same grades and which were obtained with the same equipment under comparable conditions are shown in column 5. These data on waste should be considered as relative only, because there is wide variation in the efficiency of mill organizations and their cleaning equipment, and these factors in turn affect appreciably the amount of waste.

Yarn strength is important as an index of manufacturing efficiency and of serviceability and utility of the products made from cotton. The results of yarn strength tests made by the skein method are shown for the 22s yarns in column 6 of the table and for the finest count in column 7. The strength index figures in column 8 are averages of those for the three counts of yarn manufactured. The figures have been adjusted to eliminate differences in strength that have been observed to be attributable to staple length, thus facilitating comparison from the standpoint of the effects of the other properties that go to make up quality. The basis for the strength index figures was obtained from a compilation of results from over 700 spinning tests comprising the 1935-36-37 regional variety studies. These studies embrace 16 varieties grown in duplicate at eight locations across the Cotton Belt, excluding the irrigated regions. An index greater than 100 indicates higher yarn strength than was found on the average for cotton of comparable length in the regional variety studies; an index less than 100 signifies lower strength.

Appearance is another important factor of yarn quality, because imperfections in the individual yarns have an important influence on fabric appearance. Yarns of the finest count spun, as well as the 22s yarn spun from each cotton, were graded for appearance. Imperfections stand out more prominently on the finer counts but, since these counts differ with the staple length, only the results for 22s, which are directly comparable, are shown in column 9 of the table. Tentative yarn standards developed by the Agricultural Marketing Service in cooperation with the American Society for Testing Materials were the basis for grading.

DISCUSSION OF RESULTS

In general the fiber and manufacturing tests showed the cottons from College Station, Temple, Greenville, and Chillicothe to be about average for

Classification, spinning and fiber data for a series of

Location and variety (1)	Classification		Spinning test data				
			Picker & card waste		Yarn skein strength		
	Grade (2)	Staple length (3)	Percent (4)	Remarks 1/ (5)	22s (6)	Finest count (7)	Strength index 2/ (8)
		Inches			Pounds	Pounds 4/	
College Station							
Rogers Acala	M-	1-1/32	7.60	Normal	114.8	31.8 (60s)	117.1
Coker 100-3	LM+	1-1/16	9.48	Slightly low	97.4	26.1 (60s)	94.1
Watson	SLM	31/32	8.66	Slightly low	92.9	32.2 (50s)	97.9
New Boykin	SLM	31/32	8.61	Slightly low	90.4	29.9 (50s)	92.3
Mebane (A. D. Estate)	SLM	31/32	7.59	Low	96.5	32.9 (50s)	101.1
Lankart	SLM	15/16	7.97	Slightly low	102.0	36.2 (50s)	113.0
Shafter Acala	SLM Brt.	1-1/32	8.64	Normal	105.0	29.6 (60s)	107.8
Sunshine	SLM	15/16	9.40	Normal	82.8	25.9 (50s)	86.4
Deltapine A (DPL 11-A)	SLM Brt.	1-1/32	8.06	Slightly low	95.6	22.9 (60s)	91.2
Stoneville 2B	SLM to SLM Brt.	1 to 1-1/32	8.24	Slightly low	109.1	40.4 (50s)	114.0
Washington	SLM Brt.	1-1/32	8.78	Normal	106.2	28.9 (60s)	107.5
Roldo Rowden	SLM	1	8.56	Normal	91.0	27.9 (50s)	87.7
Temple							
Rogers Acala	SLM	1	9.79	Normal	113.1	39.8 (50s)	115.8
Mebane (A. D. Estate)	SLM	15/16	9.81	Normal	98.0	31.2 (50s)	103.8
Bryant Mebane	LM	29/32	11.11	Normal	96.6	37.2 (44s)	105.8
Cliett	SLM	15/16	9.17	Normal	97.0	31.0 (50s)	102.1
New Boykin	SLM	7/8	9.68	Normal	92.0	33.3 (44s)	101.3
Watson	SLM	29/32	9.13	Normal	101.6	38.4 (44s)	109.1
Furguson 406	LM	7/8	10.65	Normal	95.0	31.3 (44s)	105.3
Sunshine	SLM	15/16	11.36	High	85.8	25.5 (50s)	87.5
Shafter Acala	SLM	15/16	8.55	Normal	101.5	33.8 (50s)	109.4
Lankhart	SLM	31/32	8.71	Normal	104.1	35.3 (50s)	108.0
Deltapine A (DPL 11-A)	LM	31/32	13.14	High	100.5	34.0 (50s)	104.1
Buckellew Mebane	SLM	29/32	8.96	Normal	96.8	37.1 (44s)	104.7
Roldo Rowden	SLM	15/16	9.00	Normal	91.6	27.0 (50s)	93.1
Greenville							
Nucala	M	1	6.21	Very low	103.8	33.3 (50s)	102.0
Lone Star D-2	M	1	6.55	Low	98.2	32.2 (50s)	97.1
Lone Star P4-1-64	M	1-1/32	6.81	Low	102.6	25.1 (60s)	98.5
B. A. R. (Kekchi)	SLM	1-3/32	9.46	Normal	114.8	31.2 (60s)	107.1
Shafter Acala	M	1-1/16	6.72	Low	104.8	27.8 (60s)	100.0
Furguson 406	M	31/32	6.68	Low	93.5	30.4 (50s)	94.3
Rowden (Malone)	M	29/32	6.79	Low	93.2	34.9 (44s)	100.8
Hog Round	M	31/32	6.09	Very low	98.8	32.5 (50s)	101.3
Qualla	M	31/32	6.21	Very low	96.5	32.6 (50s)	100.0
Watson	M	15/16	6.21	Very low	96.8	31.3 (50s)	101.6
Sharp	M	15/16	6.34	Low	99.0	33.3 (50s)	106.1
Washington	M	1-1/16	6.97	Slightly low	116.5	31.1 (60s)	111.3
Stoneville 2B	M	1-1/16	6.80	Slightly low	111.0	29.4 (60s)	105.5
Chillicothe							
Rogers Acala	M Lt. sp.	1-1/16	6.98	Slightly low	125.4	34.2 (60s)	120.7
Shafter Acala	SM Lt. sp.	1-1/16	7.06	Normal	111.4	30.0 (60s)	107.3
Mebane (A. D. Estate)	M Lt. sp.	1-1/32	8.00	Normal	97.8	24.0 (60s)	94.3
Mebane 140	M	15/16	7.47	Normal	103.1	34.1 (50s)	110.5
Qualla	M Lt. sp.	1-1/32	7.72	Normal	98.5	25.1 (60s)	96.3
Watson	M	1	6.54	Low	93.3	30.4 (50s)	92.1
Victoria							
Shafter Acala	SM	1-1/32	5.17	Very low	113.2	30.0 (60s)	112.7
Acala-Cody Lentz	SM	31/32	5.82	Low	114.8	41.2 (50s)	123.4
Acala-Hasselfield	SM	31/32	5.45	Very low	117.3	40.1 (50s)	122.4
Acala-Rogers 111	SM	31/32	5.67	Very low	121.7	43.5 (50s)	130.8
Acala-Tex. Rogers	SM	31/32	5.70	Very low	117.5	41.9 (50s)	126.2

1/ Remarks influenced by grade of cotton in each case.
2/ Average of yarn strength indices for 3 counts after correcting for differences attributed to staple length.
3/ In accordance with A. M. S. Cotton Yarn Appearance Standards. A = Excellent, A- = Very Good, B+ = Good, B
4/ Figures in parenthesis refer to count of yarn spun from the respective cottons.
5/ Differences between means of approximately 2,700 pounds are required for significance (odds of 19 to 1) and

Classification, spinning and fiber data for a series of cottons grown in Texas during the 1940 season

Location and variety (1)	Classification: Grade (2)	Classification: Staple length (3)	Spinning test data: Picker & card waste: Percent (4)	Picker & card waste: Remarks 1/ (5)	Yarn skein strength: 22s (6)	Yarn skein strength: Finest count (7)	Yarn skein strength: Strength index 2/ (8)	Appearance grade of 22s yarn 3/ (9)	Fiber characteristics: Upper quartile length (10)	Weight per inch (11)	Thin-walled fibers (12)	Tensile strength per sq. inch (13)	X-ray 40% angle (14)	Outstanding fiber characteristics (15)
		Inches			Pounds	Pounds 4/			Inches	Micrograms	Percent	1000 lbs. 5/	Degrees	
College Station														
Rogers Acala	M-	1-1/32	7.60	Normal	114.8	31.8 (60s)	117.1	B	1.208	3.99	28.3	87.6	32.1	Good strength
Coker 100-3	LM+	1-1/16	9.48	Slightly low	97.4	26.1 (60s)	94.1	B-	1.218	4.25	32.8	78.6	37.6	About normal
Watson	SLM	31/32	8.66	Slightly low	92.9	32.2 (50s)	97.9	A-	1.049	4.74	31.4	68.8	39.1	Very weak
New Boykin	SLM	31/32	8.61	Slightly low	90.4	29.9 (50s)	92.3	A-	1.065	4.73	29.9	71.2	38.2	Weak
Mebane (A. D. Estate)	SLM	31/32	7.59	Low	96.5	32.9 (50s)	101.1	B+	1.120	4.76	26.6	77.8	36.7	About normal
Lankart	SLM	15/16	7.97	Slightly low	102.0	36.2 (50s)	113.0	A-	1.163	4.60	31.3	80.4	36.5	About normal
Shafter Acala	SLM Brt.	1-1/32	8.64	Normal	105.0	29.6 (60s)	107.8	B-	1.200	3.80	31.6	77.8	38.0	Fine fibered
Sunshine	SLM	15/16	9.40	Normal	82.8	25.9 (50s)	86.4	B-	1.118	5.32	27.5	71.2	37.0	Coarse, weak
Deltapine A (DPL 11-A)	SLM Brt.	1-1/32	8.06	Slightly low	95.6	22.9 (60s)	91.2	B	1.198	4.46	25.7	79.2	36.1	About normal
Stoneville 2B	SLM to SLM Brt.	1 to 1-1/32	8.24	Slightly low	109.1	40.4 (50s)	114.0	B	1.199	4.24	26.3	86.4	31.6	Good strength, small angle
Washington	SLM Brt.	1-1/32	8.78	Normal	106.2	28.9 (60s)	107.5	B	1.196	4.12	30.7	80.6	33.6	About normal
Roldo Rowden	SLM	1	8.56	Normal	91.0	27.9 (50s)	87.7	B+	1.106	5.53	22.9	81.8	34.7	Coarse, mature
Temple														
Rogers Acala	SLM	1	9.79	Normal	113.1	39.8 (50s)	115.8	B	1.116	4.15	27.4	93.0	28.2	Excellent strength, small angle
Mebane (A. D. Estate)	SLM	15/16	9.81	Normal	98.0	31.2 (50s)	103.8	A-	1.041	4.67	30.8	80.4	33.5	About normal
Bryant Mebane	LM	29/32	11.11	Normal	96.6	37.2 (44s)	105.8	B+	.997	4.90	23.1	77.8	35.4	About normal
Cliett	SLM	15/16	9.17	Normal	97.0	31.0 (50s)	102.1	B+	1.048	5.11	30.9	78.0	35.6	About normal
New Boykin	SLM	7/8	9.68	Normal	92.0	33.3 (44s)	101.3	B+	.982	4.74	32.8	77.8	34.8	About normal
Watson	SLM	29/32	9.13	Normal	101.6	38.4 (44s)	109.1	B+	1.005	5.21	28.3	70.0	37.8	Weak
Furguson 406	LM	7/8	10.65	Normal	95.0	31.3 (44s)	105.3	B+	.962	5.38	26.8	75.6	36.8	Coarse, slightly weak
Sunshine	SLM	15/16	11.36	High	85.8	25.5 (50s)	87.5	B	1.073	5.54	27.8	71.4	34.2	Coarse, weak
Shafter Acala	SLM	15/16	8.55	Normal	101.5	33.8 (50s)	109.4	B	1.074	4.55	34.8	81.0	35.6	About normal
Lankhart	SLM	31/32	8.71	Normal	104.1	35.3 (50s)	108.0	B	1.068	4.53	32.0	84.2	34.2	Good strength
Deltapine A (DPL 11-A)	LM	31/32	13.14	High	100.5	34.0 (50s)	104.1	B	1.069	4.51	27.8	84.6	32.8	Good strength
Buckollew Mebane	SLM	29/32	8.96	Normal	96.8	37.1 (44s)	104.7	A-	1.017	5.14	26.4	72.2	37.5	Weak
Roldo Rowden	SLM	15/16	9.00	Normal	91.6	27.0 (50s)	93.1	B	1.034	5.44	27.2	77.4	31.2	Coarse, fair strength, small angle
Greenville														
Nucala	M	1	6.21	Very low	103.8	33.3 (50s)	102.0	B+	1.099	5.09	25.7	86.0	34.0	Good strength
Lone Star D-2	M	1	6.55	Low	98.2	32.2 (50s)	97.1	B+	1.118	5.16	24.2	79.0	35.4	About normal
Lone Star P4-1-64	M	1-1/32	6.81	Low	102.6	25.1 (60s)	98.5	B+	1.172	4.80	24.2	78.2	35.5	About normal
B. A. R. (Kokchi)	SLM	1-3/32	9.46	Normal	114.8	31.2 (60s)	107.1	B-	1.250	4.51	27.6	85.8	32.6	Good strength
Shafter Acala	M	1-1/16	6.72	Low	104.8	27.8 (60s)	100.0	B	1.230	4.12	27.7	76.0	38.0	Slightly weak
Furguson 406	M	31/32	6.68	Low	93.5	30.4 (50s)	94.3	A	1.035	4.92	23.7	69.6	38.2	Mature, very weak
Rowden (Malone)	M	29/32	6.79	Low	93.2	34.9 (44s)	100.8	A-	1.047	5.59	21.1	82.6	35.6	Mature, coarse
Hog Round	M	31/32	6.09	Very low	98.8	32.5 (50s)	101.3	A-	1.086	5.11	22.3	76.8	35.8	Mature, slightly weak
Qualla	M	31/32	6.21	Very low	96.5	32.6 (50s)	100.0	A-	1.101	5.01	22.7	77.0	37.9	About normal
Watson	M	15/16	6.21	Very low	96.8	31.3 (50s)	101.6	B+	1.065	4.92	33.0	70.6	39.6	Weak
Sharp	M	15/16	6.34	Low	99.0	33.3 (50s)	106.1	A-	1.131	5.16	29.4	76.0	35.7	Slightly weak
Washington	M	1-1/16	6.97	Slightly low	116.5	31.1 (60s)	111.3	B+	1.167	4.44	36.7	84.0	29.9	Good strength, small angle
Stoneville 2B	M	1-1/16	6.80	Slightly low	111.0	29.4 (60s)	105.5	B	1.206	4.23	31.9	88.4	32.0	Very good strength
Chillicothe														
Rogers Acala	M Lt. sp.	1-1/16	6.98	Slightly low	125.4	34.2 (60s)	120.7	A-	1.236	4.08	26.9	89.6	33.2	Very good strength
Shafter Acala	SM Lt. sp.	1-1/16	7.06	Normal	111.4	30.0 (60s)	107.3	B+	1.255	4.07	34.4	87.8	40.0	Very good strength, large angle
Mebane (A. D. Estate)	M Lt. sp.	1-1/32	8.00	Normal	97.8	24.0 (60s)	94.3	A-	1.127	5.14	22.3	76.8	38.0	Slightly weak
Mebane 140	M	15/16	7.47	Normal	103.1	34.1 (50s)	110.5	A	1.029	5.20	27.9	79.4	34.0	About normal
Qualla	M Lt. sp.	1-1/32	7.72	Normal	98.5	25.1 (60s)	96.3	B+	1.196	4.88	23.6	69.2	40.7	Very weak, large angle
Watson	M	1	6.54	Low	93.3	30.4 (50s)	92.1	B+	1.087	4.96	30.8	69.6	40.7	Very weak, large angle
Victoria														
Shafter Acala	SM	1-1/32	5.17	Very low	113.2	30.0 (60s)	112.7	A-	1.172	3.94	32.7	80.6	37.8	Fine-fibered
Acala-Cody Lentz	SM	31/32	5.82	Low	114.8	41.2 (50s)	123.4	B+	1.090	4.11	28.8	87.8	31.8	Good strength, rather small angle
Acala-Hasselfield	SM	31/32	5.45	Very low	117.3	40.1 (50s)	122.4	B+	1.095	4.32	31.7	80.4	34.8	About normal
Acala-Rogers 111	SM	31/32	5.67	Very low	121.7	43.5 (50s)	130.8	A-	1.092	4.10	30.0	90.2	29.9	Excellent strength, small angle
Acala-Tox. Rogers	SM	31/32	5.70	Very low	117.5	41.9 (50s)	126.2	A-	1.149	4.11	30.0	86.8	32.6	Good strength

1/ Remarks influenced by grade of cotton in each case.
2/ Average of yarn strength indices for 3 counts after correcting for differences attributed to staple length. (1935-'6-'7 Regional Variety Series = 100)
3/ In accordance with A. M. S. Cotton Yarn Appearance Standards. A = Excellent, A- = Very Good, B+ = Good, B = Acceptable, B- = Poor.
4/ Figures in parenthesis refer to count of yarn spun from the respective cottons.
5/ Differences between means of approximately 2,700 pounds are required for significance (odds of 19 to 1) and of 3,500 pounds to be highly significant (odds of 99 to 1).

cottons of their respective grades and staple lengths on the basis of the regional variety studies, whereas those grown at Victoria were well above average. All the cottons in the test performed satisfactorily during the manufacturing processes. A slight tendency of the cotton to lap around the rolls of the drawing frame was noted in a few instances, but this behavior was not associated with any particular variety or growth factor.

It is of particular interest that the appearance of yarns made from some varieties in these tests is consistently better than that of others grown under similar conditions. This would seem to indicate that fiber properties conducive to smooth and rough yarns probably are inherited characteristics and, therefore, deserve the attention of cotton breeders in their improvement efforts.

The more outstanding characteristics of each cotton, as brought out by the tests, are discussed in the following paragraphs in the order in which they are listed in the table. Where the same variety was grown at two or more places, it is possible to obtain some idea of the combined influence of soil, cultural, climatic, and harvesting conditions. Because of these influences, therefore, comparisons of spinning results should not be made between different varieties that were not grown at the same location.

Rogers Acala. This variety was found to have the highest yarn strength index of any of the cottons at each of the four places where it was grown, its index ranging from 115.8 to 130.8. This high yarn strength is undoubtedly due in a large measure to the high fiber strength, which is confirmed to a considerable extent by the small X-ray angles. Yarn appearance was only barely acceptable for the College Station and Temple samples, but it was very good for those grown at Chillicothe and Victoria. Waste ranged from normal to very low.

Coker 100-3. The yarn strength index of 94.1 must be considered rather poor in view of the fact that five of the other cottons grown at College Station were very good in this respect. Although the fiber strength was not far below normal, the X-ray angle was rather large. Yarn appearance was poor, but in this connection it should be noted that the grade of the raw cotton was lower than the others grown at College Station.

Watson. There was a considerable variation in the yarn strengths obtained from this cotton, the indexes ranging from 109.1 for the Temple sample to 92.1 for the Chillicothe sample. It appears that this is an inherently weak-fibered cotton, as all fiber strengths were below 71,000 pounds per square inch. In general, this was confirmed by the large X-ray angles. The yarns were good to very good in appearance, and the manufacturing waste was normal to very low.

New Boykin. This variety also gave somewhat different yarn strength indexes for two locations. The low index at College Station was probably due to the low fiber strength, which is substantiated by the rather large X-ray angle. Yarns were good to very good in appearance.

Mebane (A. D. Estate). Yarn strength indexes for this cotton were about normal, except at Chillicothe, where it was somewhat low. Fiber strengths were not far from average although for the Chillicothe sample the X-ray angle was rather large. Yarn appearance was good to very good, and waste percentages were normal to low.

Lankart. Yarn strengths were very good, as shown by indexes of 113.0 and 108.0 for the samples grown at College Station and Temple, respectively. Fiber strengths were average to very good for the two samples. Although the yarn appearance of the College Station sample was very good, that from Temple was barely acceptable.

Shafter Acala. The results for this cotton, which was grown at all five of the locations, were variable in many respects. Yarn strengths were normal to very good for the respective staple lengths, and fiber strengths ranged from slightly low to very good. The strongest-fibered sample of this strain was grown at Chillicothe and had the largest X-ray angle, a fact which is difficult to explain. Although the five strains of Acala, including Shafter, grown at Victoria were all well above normal from the standpoint of yarn strength, the Shafter strain was found to be the lowest even though its staple length was appreciably longer.

The yarn appearance was good to very good for the Chillicothe and Victoria samples, but poor to barely acceptable for those from College Station, Temple, and Greenville. The yarn appearance grades from the samples grown at the three latter locations are more in line with the results obtained for Shafter Acala in a number of other tests. Manufacturing waste percentages ranged from normal to very low.

Sunshine. Yarn strengths were very low for both samples. This variety appears to be essentially coarse and weak-fibered. The yarn appearance grades were rather poor, and waste ranged from normal to high.

Deltapine A. The results obtained for this variety differed considerably between the College Station and the Temple samples. The College Station sample was longer in staple but produced weaker yarns; in fact, the strength index was quite low. Fiber strengths were normal to good, however. The fiber strength for the Temple sample, 84,600 pounds per square inch, is one of the highest yet obtained for this variety in the Service's laboratories. This strength is confirmed by the small X-ray angle obtained. Yarn appearance was only barely acceptable for both samples, which showing is not as good as the one previously obtained for this variety. The Temple cotton was classed as Low Middling, but the waste percentage was high even for this low grade.

Stoneville 2B. Yarn strength indexes and fiber strengths for the two samples were good to very good. Yarn appearance grades were only barely acceptable.

Washington. The sample of this variety grown at Greenville possessed high yarn strength and good yarn appearance. It was found to be fairly strong-fibered and gave an unusually small X-ray angle. The sample grown at College Station was somewhat shorter and weaker, and the manufacturing quality was not so desirable as that of the other sample. Nevertheless, it would be considered to be at least of average quality.

Roldo Rowden. Yarn strength indexes were quite low, although the fibers were of about average strength, and the X-ray angles were normal to small. The fibers were coarse, which is characteristic of the Rowden variety. Yarn appearance was acceptable to good, and manufacturing waste was about normal.

Bryant Mebane. Nothing outstandingly good or poor was observed for this cotton, which may be considered an average cotton with yarn strengths slightly better than average.

Cliett. This is also an average cotton in practically every respect.

Buckellew Mebane. Although the fiber strength for this cotton was rather low, its spinning performance was good, its yarn strength average to good, and its yarn appearance very good.

Nucala. A previous spinning test of this cotton gave excellent results, compared with which results of the present test were somewhat disappointing in that yarn strength was found to be only about average. Fiber strength was very good, with a normal X-ray angle. Waste percentage was very low for Middling cotton, and yarn appearance was good.

Lone Star D-2 and P4-1-64. These two Lone Star strains were quite similar, except that the P4-1-64 was somewhat longer and finer-fibered. Yarn strength indexes and fiber strengths were about average. Manufacturing waste was low, and the yarn appearance was good.

B. A. R. (Kekchi). Good yarn strength but poor yarn appearance was found for this cotton. The fibers were strong and of medium weight per inch. In many respects this sample appeared to be similar to Shafter Acala.

Rowden (Malone). Yarn strength index was about average, as was fiber strength. This sample was coarser-fibered and possessed fewer immature fibers than any other variety in the test. Waste percentage was low, and yarn appearance very good.

Hog Round. Average yarn strength, very good yarn appearance, and very low manufacturing waste characterized this sample. Fiber strength, substantiated by the X-ray angle, was slightly below average.

Qualla. The two samples differed considerably in their test results, that from Greenville giving both a higher yarn strength index and a higher fiber strength than that grown at Chillicothe. The former also yielded a very low percentage of manufacturing waste and produced yarns of very good appearance. The Chillicothe sample made yarn of good appearance and was more nearly average in its spinning performance.

Sharp. This sample possessed very good spinning quality with respect to yarn strength and yarn appearance. Although classed as 15/16 inch, the array data indicate that it might conform to the average 1-inch sample in length. Fiber strength was slightly below average.

Mebane 140. The very good yarn strength and excellent yarn appearance of this cotton indicate that it is a desirable cotton from the standpoint of manufacturing properties. It was fairly coarse-fibered, and possessed about average fiber strength.

Acala-Cody Lentz, Hasselfield, and Texacala (Rogers). All three of these samples of Acala, which were produced at Victoria, gave unusually high yarn strength indexes. They also made yarns that were graded good to very good for appearance. Both the Cody Lentz Acala and Texacala (Rogers) samples were strong-fibered, the Hasselfield Acala sample being about average in this respect. The latter sample was found to be slightly heavier in fiber weight per inch than the other samples.